

TYPHUS EXANTHEMATICUS IN ROMANIA DURING THE SECOND WORLD WAR (1940-1945) REFLECTED BY ROMANIAN MEDICAL JOURNALS OF THE TIME

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Abstract

This article provides a picture of exanthematic Typhus in Romania during the Second World War: epidemiological aspects of this disease in the inner zone and in the zone of military operations, as well as information about the diagnosis, treatment and prophylaxis of the Typhus in our country during this period.

Keywords: Typhus, Second World War.

Introduction

Typhus (> gr. *τῆφωσις* = prostration, stupor [1]) is an infectious disease from the group of exanthematous fevers (rickettsiosis), that occurs under excessive pediculosis, favoured by: war, drought, famine or any other circumstances that cause misery, promiscuity and the negligence of the body hygiene [2].

Until 1916, in Romania only isolated cases or low outbreaks of Typhus especially were recorded among Gypsies in the outskirts of Bucharest [3,4,5]. Since 1916, the cases of Typhus increased due to the refugees arrivals in Romania from Serbia (which was invaded by Austro-Hungarian troops) and the Serb prisoners' repatriation from Austria-Hungary [6].

In August 1916 Romania enters the First World War. In December 1916, "*Weary of marches and battles, poorly dressed, more hungry [...] the Romanian Army withdrew to Moldavia on a bitter cold [...] In the areas where the regiments were quartered, one could often see 25-30 people crammed in a tight cottage*" [4]. Under these

circumstances, the great Typhus epidemic breaks out in Moldavia, because of existing cases among Russian troops (who were operating in the region), among Bulgarian spies who roamed the country and among the refugees from Serbia and Bulgaria [4,7,8]. Ion Cantacuzino depicts an impressive picture of the epidemic: "*Whitened by lice, they were scattering disease in their path [soldiers, refugees, locals]; some of them fell dead in the road [...] on the railway station platforms, roadways, hospital doors [...] stood piles of corpses crowded by hundreds on top of one another*" [4]. The epidemic began in December 1916, reached a maximum in February 1917 and in June 1917 was almost extinguished; there were about 500,000 estimated cases [6].

During 1920-1939, Bessarabia was the most contaminated region of the country (accounting for 85% of all cases of typhus reported in Romania) due to geographical location. It is situated near Ukraine – a highly contaminated area, with poor hygiene conditions; roads became impassable in winter, preventing application of preventive measures. From the endemic region of Bessarabia the Typhus spread to other parts of the country. One of the reasons was the seasonal employment of Bessarabian workers for agricultural labor, vineyards and

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forest [6].

Romania participated in the Second World War during 1941-1945.

The epidemiology of Typhus in Romania during 1941-1945

In this period, it was already known that the etiologic agent of Typhus was "*Rickettsia prowazeki, pleomorphic microorganism yet unclassified, Gram negative [...] parasite of the living cell*" [9], not grown in laboratory environments, stained with Giemsa; the assumption of a filterable virus was also taken into account [7]. *Pediculus corporis* was known as a transmission vector [5].

Men and domestic animals were considered sources of infection. The main epidemiological factors were represented by the conditions that allowed proliferation and spread of lice [8].

Some authors rejected the hypothesis of direct human contamination [9] ("*The seat of the virus [...] is only in the blood*" [8]), while others left room for the uncertainty ("*It is inconceivable for it to pass to humans in a way [...] unknown*" [8]). In the epoch, there were two assumptions of indirect contamination: the lice's bite and the lice's droppings that penetrated the skin after crushing them while scratching through the lesion caused by the bite or from the scratching [10]. In addition to the tegument there are mentioned, as potential gateways, the conjunctival mucosa, respiratory mucosa, oral mucosa [2]. The infection is possible through the dry droppings that are pulverized or through the contaminated laboratory products [11].

The patient was considered contagious in the last days of the incubation period, the entire illness period and the first days of convalescence [12]; after that, patients have a long-lasting immunity against the disease, recurrence being exceptional [4].

In the following we will briefly present the Typhus epidemics that occurred between 1941-1945 both in the inner zone and among the Romanian combatants, as they were reported in the Romanian medical journals.

Epidemics in the inner zone. In November 1941, a Typhus epidemic broke out in a Romanian concentration camp for Russian prisoners: "*A large number of Russian prisoners of war fell in captivity [in summer 1941], staying in a camp inside the country [...], in the poorly built barracks, without light and ventilation and without heating [...]. The prisoners worked daily at the construction site, could not rest at night because of this exhausting excessive parasitism. In the absence of sufficient water, they fell into a dreadful condition of corporeal dirt[...]. In November 1941, the first cases of Typhus were noticed [...] This was followed by a great number of patients, many of them dead. The epidemic was extinct in February 1942*" [2].

During November 1941-June 1942, there was a Typhus epidemic in Craiova, with 58 cases. It appears

that the source of contamination came from the army. The infection was spread by a troop boy. The mortality rate reported was of 2.24% [13].

In the winter of 1941-1942, an epidemic occurred in northern Bessarabia, with 1626 cases (3.6% mortality) "*caused by the convoys of Hebrews*" [14].

At the end of 1941, about 50,000 Hebrews from the Goltz county from Bessarabia were deported, some being sick with Typhus. In July-August 1942, about 12,500 Gypsies were also deported in this county. In these circumstances during November 1942-July 1943 there was a Typhus epidemic with 348 cases (1.75% morbidity, 3.9% mortality) even though Romanian government had built several fix furnaces for de worming [15].

In 1942, 4834 cases were registered nationwide (the average of the years 1935-1939 being 3621) [16].

After the Second Vienna Award (30 August 1940) Romania loses half of Transylvania (43,492 km²), and from this moment the University Clinics of the University of Cluj moved to Sibiu. During the 1941-1944 they are known as University and Clinics from Cluj-Sibiu. [48,49].

The Clinic of Infectious Diseases Cluj-Sibiu reported in 1940 0 cases of typhus [17], in 1942 3 cases (0% mortality) [18], in 1943 109 cases (4.5% mortality) [19] and in 1944 145 cases (10.35% mortality) – of which 81 were brought by a sanitary train from Moldavia [20].

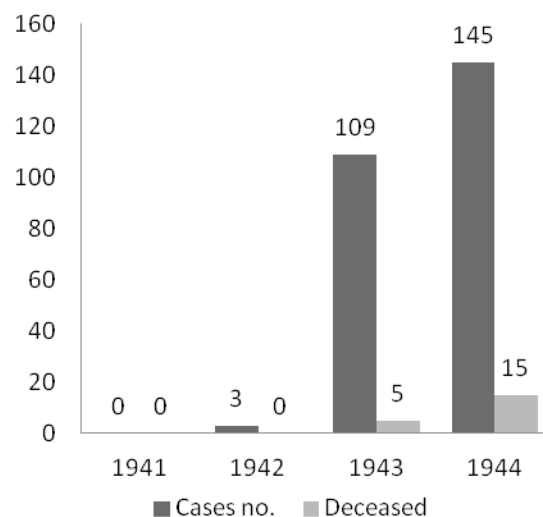


Figure 1. Number of cases and deaths in the Clinic of Infectious Diseases Cluj-Sibiu in the period 1941-1944.

Source: The annual reports from The Clinic of Infectious Diseases, from the Journal mentioned above.

The chief physician of Cluj County published in 1943 a series of problems in isolation and internment cases of Typhus: "*Early in the disease, before phenomena are not too severe, when most patients [...] bargain very hard to be removed from the familiar environment or oppose to the measures indicated, sanitary doctors should use their*

authority, the power of persuasion and determine the action of police authorities to apply the constraining means. [...] The transport difficulty is in relation to the distance from the hospital and is heightened by the contraindication to use the public transport (trains, buses), especially in the large outbreaks when many people need transportation. [...]

Even after sending the patient, often the isolation was not accomplished. Some people arriving into town avoided going to hospital, taking refuge with relatives or returning home invoking various reasons, that they had not been admitted to the hospital because they were not so ill, and other purposely invented reasons.” [21].

The Gypsy neighborhoods or the villages represented receptive environments to the disease and often had small outbreaks of Typhus. For example, in a commune in Cluj County a limited epidemic of 18 cases (16% mortality) occurred in 1941 – thanks to a sanitary cordon ensured by gendarmes and policemen – 18 cases (16% mortality) [22].

The epidemics in the zone of military operations.

Although the Eastern battlefield accounted for the most important outbreak of Typhus of Romanian troops, [2] in the first two years of war, morbidity and mortality caused by Typhus on the front line were low [23].

From the statistics of a Romanian campaign hospital (unidentified by us) it results that in the period March-July 1942, 93 patients were interned with Typhus (8% mortality), mostly gendarmes responsible for guarding prison camps [24]. The medical conduct on the internment of patients with typhus in this hospital was: *“The incoming patients were completely stripped in the bathroom [...] the personal items that could be put in drying stove were enclosed in a wooden box lined with zinc and sent immediately [...] to the drying stove. Those which could not be immediately put in the drying stove were burned, except the valuable ones, which were immersed in a bath of oil and gas [...] the sick were immediately pruned and shaved on the whole body, bathed with warm water and then anointed equally with oil*

and petroleum [...] then were given back the clean personal items and then were passed in the salons.” [24].

The Campaign Hospital No. 10 reported 135 cases of typhus for the first six months of 1942 [25]. The Campaign Hospital No. 531 Tiraspol reported for the first six months of 1943 175 cases, with 3.5% mortality [26]. Among the Romanian Army troops from the bridgehead Kuban and Crimea, during 1942-1943, there were 333 cases of Typhus, with 1.8% mortality [27].

The diagnosis and treatment of the Typhus in Romania during 1940-1945

We present below the descriptions of the disease as they remained published – from the cases observed in the Romanian medical literature of that time.

The Clinical Picture. Encompassed usually the clinical triad: rash, fever, nervous symptoms [8].

I. Incubation ranged from 7 to 23 days [4]; sometimes digestive disorders, mild headache, and subfebrility in the evening appeared [28].

II. The invasion period: sudden onset through chills followed by fever, which grew progressively within the first 24-48 hours to 39-40°C; the patient had congested face, vomiting, intense headache, malaise, epistaxis, congestion of the conjunctival mucosa [7] and neuro-psychiatric disorders (the most severe form): *“The patient lies inert [...] in a deep state of torpor”* [29].

III. The state period (8-18 days [7]): the temperature remained constant at 39-41°C (38.5°C in mild forms [24]) with slight remission in the morning [28]. Mild hepatosplenomegaly appeared, that regressed with fever [24].

Exanthematous eruption (Fig. 2) occurs in the days 4-8 after onset. In the first phase small pink papules appear, located on the sides of the thorax and abdomen and shoulder region, and, in the severe forms, on the entire skin, except from the face, palms and soles. The papules were slightly revealed with irregular contour and disappeared under



Map 1. Map of Romania with the lost territories in 1940.

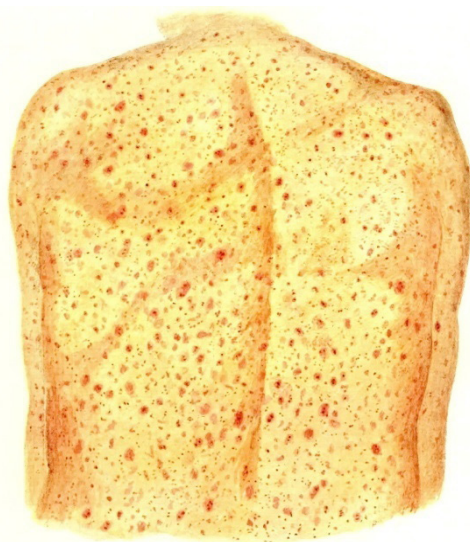


Figure 2. Exanthematous eruption

Source: Mohr L, Staehelin R (eds.). *Infektionskrankheiten* Vol. I. Berlin: Verlag von Julius Springer; 1925: 660.

pressure. In the second phase, papules evolved differently: in mild forms, they became pale and disappeared; in the severe forms the color accentuated from pink to red-purple; in very severe cases the papules became hemorrhagic with confluent tendency. If evolution was favorable, in the last phase papules gradually disappeared, after which they produced a fine desquamation of the skin [7,5,24,12].

Neuropsychiatric disorders amplify: *“The individual is in a state of extreme stupor interrupted by bouts of delirium [...] first delusion is nocturnal and diurnal afterwards [...] replaced by coma when the evolution of the disease tends to end lethally”* [29].

In the toxic and hypertoxic forms the extremity tremor, incontinence or retention of urine and feces, hiccups, swallowing disorders and shortness of breath [5] (with Cheyns-Stokes), impotence to propel tongue, strabismus, nystagmus, spasmodic laughing and crying add up [7].

Cardiovascular disorders. Arterial hypotension occurs the first days of illness due to systemic vasodilatation caused by specific vascular lesion [30] and by adrenal lesions [5]. Typical myocarditis determines the pulse acceleration independently of the fever curve and the emergence of signs of heart failure (mild hepatomegaly stasis and edemas on the shanks). Under the influence of fever the pulse rate does not exceed 130/min [24].

IV. The decline period: *“If the patient does not succumb suddenly in this period, a sudden improvement of the condition intervenes”* [29]. Fever decreases in *lysis* or *crisis* and nervous and cardiovascular symptoms diminish; some authors argue that the fever decreasing in *lysis* is rare, only in complicated cases [7,28], while others argue the reverse hypothesis (*lysis* is met often and *crisis* rarely) [24,12,31].

V. The convalescence lasts for several weeks, with the inability to work [29]. The increased fever in this period is due to complications, other associated infectious diseases or idiopathic [32].

There are many classifications of clinical forms. Basically, there are the following forms:

a. The inapparent form – detectable only by laboratory tests. We mention the experimental contributions of the Romanian professors N. Ciucă and I. Bălțeanu to the development of knowledge about this form of the disease [7,33].

b. The mild form – febrile reaction does not exceed 38.5°C and low duration, exanthematous eruption is attenuated or fugax, wet tongue, nervous disorders are missing; occurs with predilection at children; mortality is 0% [7,31]. *“Sometimes the patients can carry on with this form of illness, hence its epidemiological importance”* [30].

c. The moderate form presents the characteristic symptoms of the disease, with neurological phenomena or reduced heart failure, dry tongue; 1.6% mortality determined by suppurative complications [7,31].

d. The toxic form – pronounced neuropsychological phenomena, multiple complications; 2.6% mortality [7].

e. The hypertoxic form – extreme psychomotor agitation with furious delirium accompanied by the phenomena mentioned above. The exanthema is turning into sanguine suffusions, the tongue is very dry, with fuliginosity. In the extremities significant circulatory disorders appear (called by D. Danielopolu the syndrome of extremities), staged in three phases: red vasodilation, hot cyanosis followed by cold cyanosis and gangrene. Death (76% of cases [7]) occurred through toxico-septic shock, or cardiogenic, or complications [5,29,31].

Laboratory. The blood samples were sent to the laboratory in *“test tubes in wooden package”* [21].

The blood picture revealed leukocytosis, polynucleosis with vacuolar degeneration phenomena [34] and thrombocytopenia [35].

Myelography. In the state period multiplying blasts of granulocytic series were noticed, and the percentage of lymphocytes was slightly decreased. In convalescence a slight eosinophilia appeared, but on the other lines myelogram restored to their normal appearance [34].

Biochemistry. Cerebrospinal fluid presented xanthochromia and was rich in albumin [5]. The blood urea was sometimes increased, the diuresis at <800 ml/24 h with albuminuria; urinary sediment was rich in red blood cells, granular cylinders and leukocytes [30]. A study shows that during the disease the glucose was increased and the cholesterolemia low [36].

Bacteriology – serological reactions. Positive Weil-Felix reaction (agglutination in tubes with antigen Proteus X₁₉O) represents the standard laboratory diagnosis [37]. The reaction Kudicke-Steuer (agglutination on the blade with antigen Proteus X₁₉O) could run fast at the patient

bedside [38].

The cytological examination of cerebrospinal fluid reveals mononuclear cells type Türk. C. Bart suggests that the Weil-Felix reaction performed from the cerebrospinal fluid was more sensitive than the sanguine one [39].

It requires **differential diagnosis**: rubella (not involve face and neck), scarlet fever (no healthy tissue between the spots and evolution with skin desquamation), urticarial poisoning (does not evolve very high temperature), early syphilis (present chancre), typhoid (gastrointestinal disorders predominate) [28,12].

Complications. Respiratory complications (frequent) serous pleurisy or purulent, pleural empyema, pulmonary congestion, pneumonia, bronchopneumonia, lung abscess, pulmonary gangrene [24,12,40,31].

Cardiovascular complications (frequent): endocarditis, myocarditis, arteritis obliterans, thrombophlebitis, gangrene of the extremities [28,40,24], gangrene of the scrotum [20].

Kidney and liver complications: nephritis with albuminuria [28,30], hepatitis accompanied by jaundice [30,40,28].

Unlike the nervous phenomena encountered in the disease, the nervous complications were durable and rarely observed: meningeal syndrome, epileptic seizures, syndromes of motor deficit (hemiplegia and monoplegia, due to a local arteries with a consecutive softening of the brain), extrapyramidal syndrome (disappears with fever decrease and is due to vascular disorders of the basal nucleus), cerebellar syndrome, bulbo-protuberantial syndrome with bulbar phenomena (dyspnea, tachycardia, hypotension) and cranial nerve palsies, and acustico-vestibular disorders (hypoacusis, nystagmus, vertigo), sphincter disorders, psychiatric disorders [41].

Ocular complications: cataract, iritis, chorioretinitis, retinal hemorrhage, paralysis of the eye muscles (during febrile), thrombophlebitis with gangrene of the eyelids, orbital phlegmons and corneal ulcers (in convalescence). A case of central retinal occlusion was reported [42].

Obstetric complications: spontaneous abortion [32,20].

Other complications: suppurative parotiditis [24,30,31], otitis [40,32,31], deafness [28].

Pathological Anatomy. At body inspection it is noticed that the exanthema do not persist long after death and can be confused with cadaveric lividness [40].

At necropsy, macroscopically "*the phenomena of excessive vasodilatation predominate everywhere*" [29].

At the level of meningo-encephalitis mass it is noticed diffuse hyperemia and edema and on the section - punctiform hemorrhages, foci of softening, dilated ventricles filled with a pink-yellow liquid and a congested choroid plexus (exanthematic encephalitis) [7,5,41]. The airways show congestion and the adrenal capsules – hemorrhages [40].

Microscopically, vascular endothelial swelling is observed, followed by its necrosis and obstruction of the vessel; intramural and perivascular lymphocytes and plasma cells are crowded, nodular or diffuse (nonspecific endothelitis) [7,43].

Treatment. Hygienic-dietary treatment. Nasal, oral and pharynx cavities, external auditory canal and the skin were cleaned – depending on the healthcare supply – with gomenol oil, fenicated glycerin, boric acid, Boro-glycerine, H_2O_2 [12,44]. The salons of the exanthematic people were cleaned with oil, $Ca(OH)_2$ and phenol [28,44]. The diet contained lacto-hydric mellitus during the febrile stage, lacto-farinaceous after lowering of fever for 7 days, after which, in the cases without complications – complete nutrition [40]. In severe cases, the nutrition was parenterally ensured with glucose, physiological saline and calcium chloride [20].

Symptomatic treatment included: vasopressors (ephedrine and strychnine), cardiac (strophanthin, veritol, veriazol, camphor oil, simpatol, cardiazol, caffeine), anti-pyretic (pyramidon, antipyrine, veronal, dolantin, dilaudid, bandage and cold enemas), antiseptic (urotropine) [28,12,27,44]. The nervous disorders were attenuated with scopolamine-morphine and barbiturates [24].

The antibiotic treatment consisted of red and white sulfonamides, orally and by injection (sulphapyridine, daganan, eubastin, eleudron, septamid, gonopneumocid, rubiazol, sulfazol, prontosil) [12]. Sulphonamides do not shorten the disease progression, but prevent septic complications, especially bronchopneumonia [24,27,31].

Medication is administered in small doses, especially when there are overlapping renal complications [28].

The serotherapy gave unsatisfactory or inconclusive results [4,12,6]. D. Danielopolu proposed a treatment with chlorinated water i.v. [5] which some authors consider effective in hypertoxic forms [26].

The treatment of vascular complications may involve, depending on the physician's judgment, administration of pain relievers (morphine), lumbar sympathectomy, periarterial sympathectomy, periarterial infiltration with novocain 4%, amputation [24,31].

For urinary retention, bladder catheterisation is required [40].

Suppurative parotiditis claims an unfavorable prognosis and require surgical treatment as early as possible [24,31].

The Typhus prophylaxis in Romania during 1940-1945

Starting with 1934, the Ministry of Health organized a national program for Typhus prophylaxis, which included the following general measures: the detection and declaration/the report of the cases of Typhus; isolation and disinfection of the patients and their direct contacts;

deworming the clothing and the personal items; deworming penitentiaries and public places (inns, pubs); limiting circulation of vagabonds and nomadic gypsies; prohibiting free trade with used clothes; requiring landowners to hire workers based only on a health certificates showing that they do not come from contaminated environments. Locally, the organization of deworming activities in rural areas and in some urban districts ("hygiene week") was required twice a year, involving personal hygiene measures (bathing, trimming, applying a mixture of petroleum and oil or acetic acid across the skin), sulphurisation of the fur objects, boiling linen, whitewashing the houses and health training of the population [6].

To prevent the spread of Typhus in Bessarabia, the Ministry of Health established a sanitary cordon in 1938, responsible for the supervision and control of the connection lines of this region with the country. Thus, the railway journey was prohibited if the passengers did not present medical evidence of health or deworming. Travelers and train personnel could be subjected to health control and in some stations there were special spaces for deworming. The sanitary cordon was also responsible for the supervision and control of the means of transport by water (Pruth, maritime Danube between Sulina and Brăila and the Black Sea coast), the supervision of bridges and roads across the Pruth and of all persons passing from Bessarabia by foot or by carts [6].

We found out from an article signed by the chief doctor of Sibiu in 1943 how Typhus prophylaxis was accomplished on the field in the inner zone after Romania entered the war.

a. The deworming of the people: *"Men and children were trimmed and completely stripped, washed with warm water and soap and rubbed with a mixture of petroleum and vegetable oil. Women were rubbed with petroleum throughout the body, head hair was treated with a mixture of vinegar and petroleum, and they often combed with a dense comb"* [21]; in the accessible areas, *"the bathing is done at the showers. [...] In remote villages the bathing can be done only in the vat"* [21].

b. The deworming of objects: *"Clothes and other items of silk [...] were only ironed. The lingerie and the linen were passed through the boiling cauldron for 30 minutes, the items of animal origin, hats, coats were sprayed with petroleum, hermetically sealed for 24 hours, then exposed in the room where sulphurisation was performed"* [21]. In the accessible areas, the deworming furnace was used instead of the cauldron: *"The atmospheric conditions prevented us often to achieve a good deworming. Wind and then cold, have not allowed the realization of an appropriate temperature inside the furnace. [...] With all our care, it happened to burn partly the clothes put at deworming; we could use drying stoves only in the vicinity of Sibiu"* [21].

c. The deworming of houses: *"by washing the furniture with lye, petroleum and finally proceeding to*

sulphurisation" [21].

With regards to the mentality and the willingness of population towards the preventive means, we find from the same article that *"The population is not sufficiently hostile to lice and there are also some people who believe that is something natural to have here and there a parasite. Often, in the case of the gypsy population, more drastic means of persuasion had to be taken, demanding all the energy of the sanitary officers and gendarmes to make them understand the importance of not having lice [...] In the gypsy neighborhoods [...] on the every hovel door, a panel with the name and age of every person who habitually slept there was applied, and sanitary agent in the control made calls according to that list. The deworming date of individuals and households were also noted on the panel. Only in this way, cases discovery and prevention of control avoidance was achieved"* [21].

The deficiencies of the deworming campaigns undertaken during this period are significant. Primarily, collaboration between the sanitary and the administrative territorial or military authorities was deficient: *"The state institutions are not all fully convinced of the danger of lice in the Typhus issue"* [45], *"Many [people] with management and supervisory roles – civil and military authorities – [...] are not convinced of the danger of lice and the need of deworming [...] arguing with absurd theories, 'lice are born from skin, only the dead have no lice, the louse is the oldest military contingent' [...]. The authorities (mayors, gendarmes, military chiefs) adhere to the public mentality, tolerating avoidance of deworming, thus sabotaging the medical action."* [46].

Secondly, the deworming campaigns do not focus on the preventive side of pediculosis, of educating people, but on the curative side: *"Ignorance and stupidity [...] can not be fought against with the drying stove or the furnace, but only through culture and education. [...] the drying stove goes away, while the louse remains [...] Doctors work in vain because success does not last longer than a week (as long as the drying stove stays in the village) and after that the parasites appears again."* [46].

Thirdly, the population had acquired fear and hatred against the deworming campaigns, because they neglected aesthetic considerations (*"Some clothes get a nasty look after boiling or after crossing through drying oven: woolen clothes shrink and get crumpled [...] the colored counterpane mixes its colors, white pants get smudged. Therefore the people prefer to wear clothes with parasites only to have a presentable appearance. In the regiments some soldiers wear shirts [...] keeping at all costs to be elegant and ironed, even at the cost of parasites."* [46]) and parasiticides used some toxic substances (*"The air in the room remained sulphurous for a long time (3-6 weeks), unbreathable [...] petroleum caused serious skin irritation [...] not to mention hydrocyanic acid whose victims were almost always intoxicated instantly and deadly"* [46]).

Sometimes, some exaggerations were committed: *“The villagers [were taken to] 8-20 km through wind, cold and rain or blizzard, under the pretext of disinfection [...] These people waited for hours outside in the cold for their turn, and after the bath, another 20 km march through the frost followed”* [46].

All this determined people to *“run away from the deworming teams like mad and hide their clothes in the attics, in the bathroom, or even in the woods”* [46].

In the military, the parasiticide effect of the cold was often misunderstood: *“It was believed in the Army that people have lice because they sleep dressed [...] it was forbidden for people to sleep with their shirts on [...] even if it was freezing cold outside [...] and even if there was no fire in the stove”* [46].

In the Romanian medical literature of the time there isn't a unitary point of view on the most effective and fastest ways of deworming. Some doctors believe that the drying stove was the most effective method, followed by the deworming furnace [8], while others sustain it was the boiling [46]. It is likely that the efficiency of petroleum was overestimated [46]. It was proposed to use DDT (dichlorodiphenyl-trichloroethane) as a more effective parasiticide [47,8].

Regarding the safety of medical personnel taking care of the Typhus patients we know that *“the staff [...] were dressed in long gowns, down to the ankles, tightly closed at sleeves and neck, with white bonnets on the head. [...] The entire staff [...] were vaccinated against Typhus; vaccine came from Cantacuzino Institute* [24].

During the Second World War, the National Institute of Serums and Vaccines “Dr. I. Cantacuzino” prepared an anti-exanthematic vaccine used in the country to vaccinate medical staff which took part in fighting against the Typhus epidemics. The vaccine was prepared *“From the lungs of infected mice with the rickettsian virus, by the respiratory route. [...] The vaccination consists in 3 injections practiced with increasing doses (0.5 cc., 1 cc., and 1 cc.) at intervals of 3-5 days. [...] A mass vaccination in the epidemic environments can not be carried out because of relatively small quantities of vaccine that can be produced”* [8].

Conclusions

In the period 1941-1945, when Romania was actively involved in the war, the number of exanthematic typhus cases increased, but there were no major epidemics with high mortality. Despite the political conditions of the time, by the prophylactic and curative activities carried out by the medical authorities of the country, the exanthematic Typhus problem was well managed, and its spread limited.

Through the research and analysis articles on this pathology published in medical journals of the time, we provide a picture of exanthematic Typhus in Romania during Second World War.

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